

660250 2721650

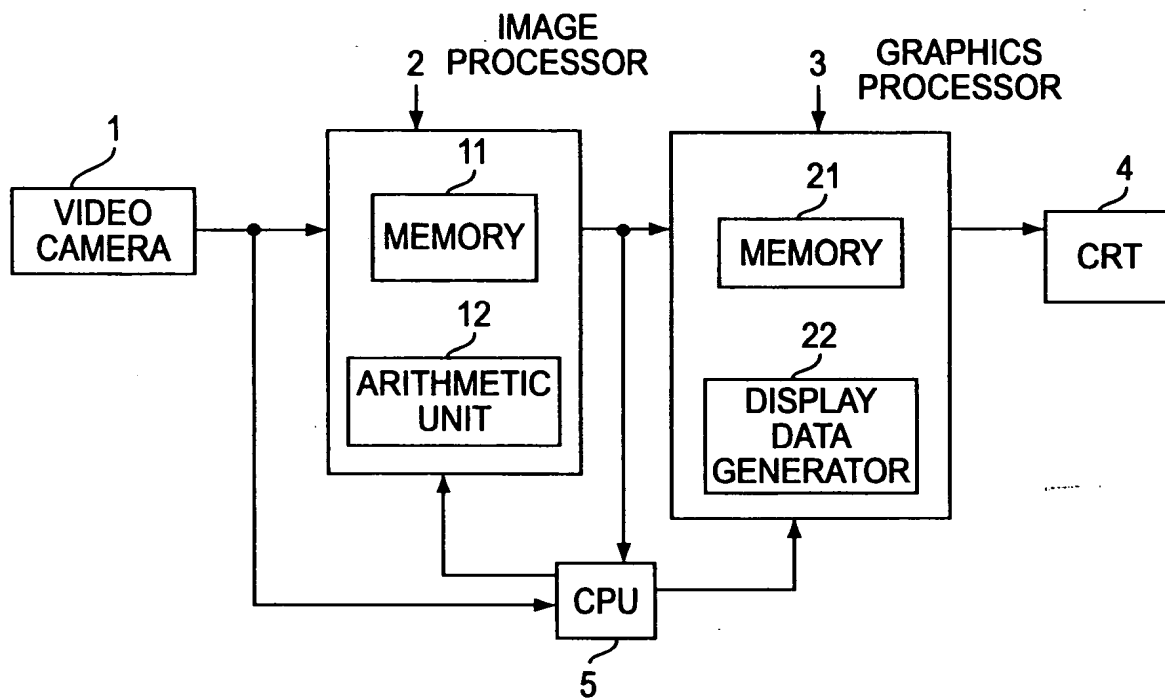


FIG. 1
(PRIOR ART)

50 Figs

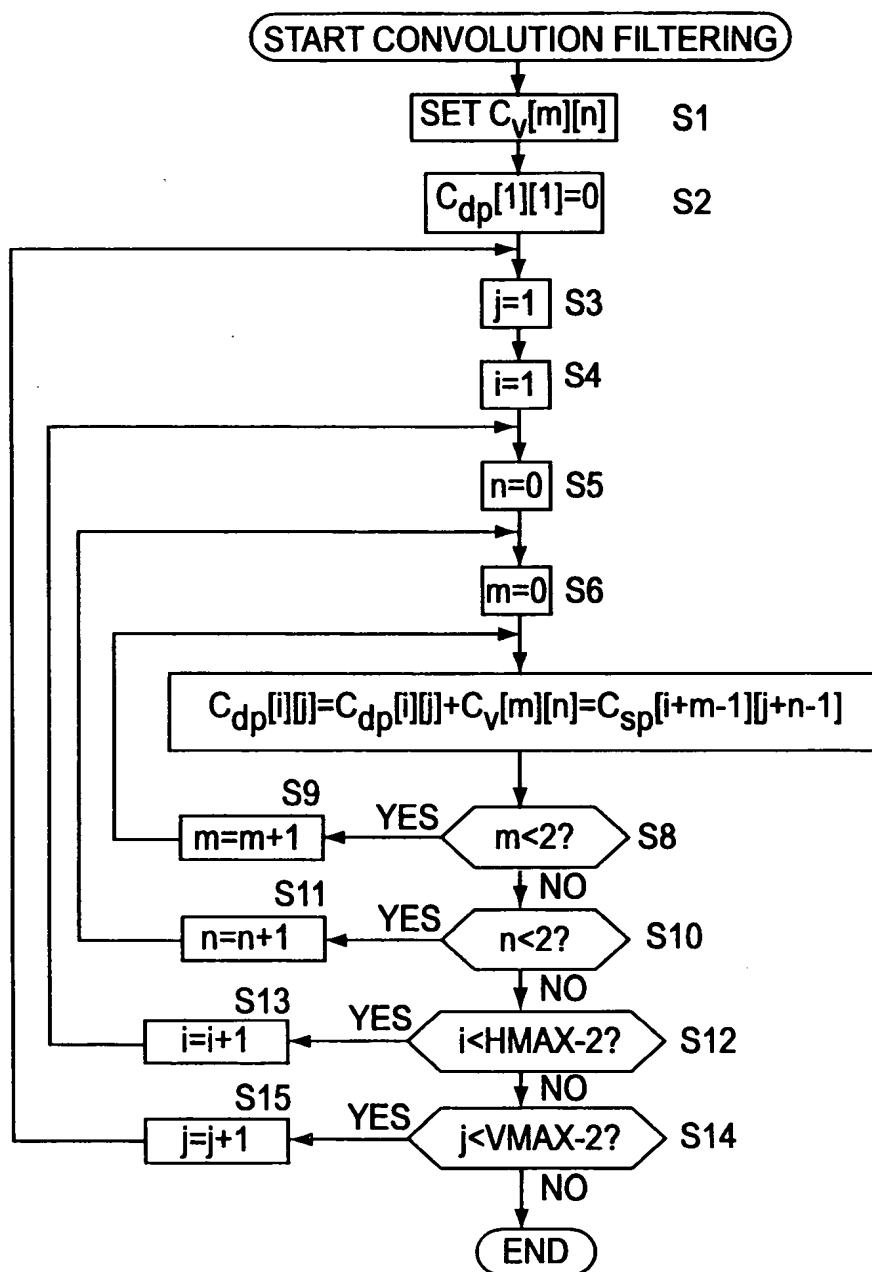


FIG. 2
(PRIOR ART)

C_{sp}

i

	0	1	2	3	4	HMAX-1
0						
1						
2						
3						
4						
VMAX-1						

j

FIG. 3
(PRIOR ART)

C_v

m

	0	1	2
0			
1			
2			

n

FIG. 4
(PRIOR ART)

004574 053093

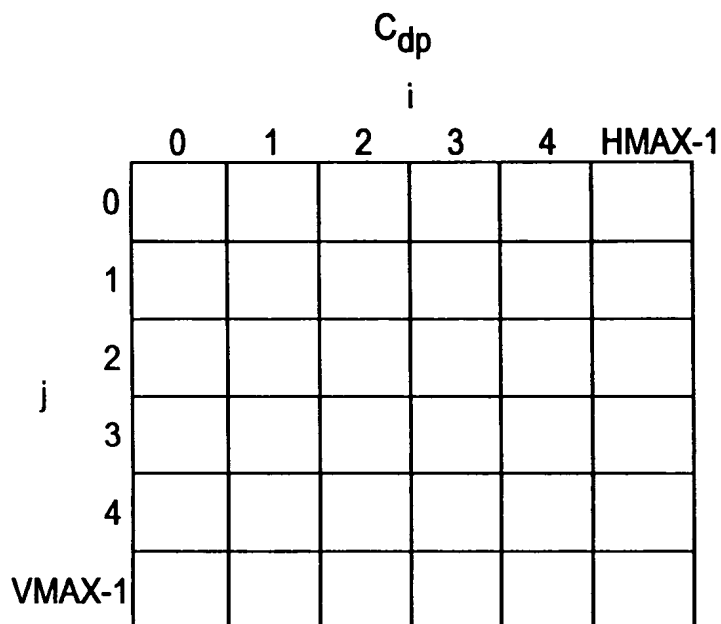


FIG. 5
(PRIOR ART)

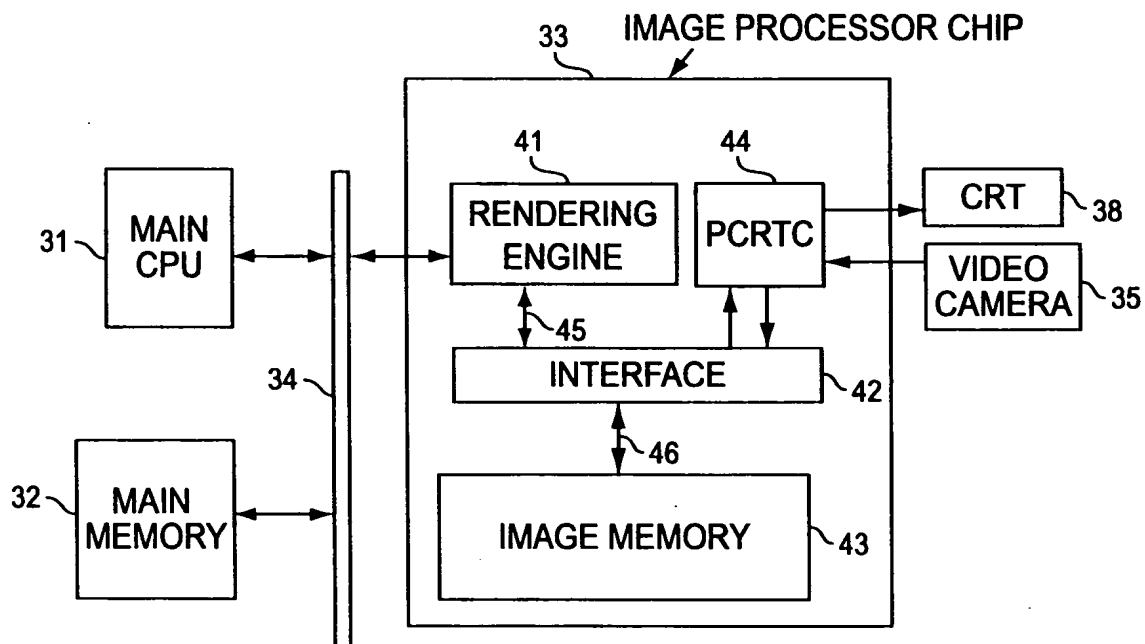


FIG. 6

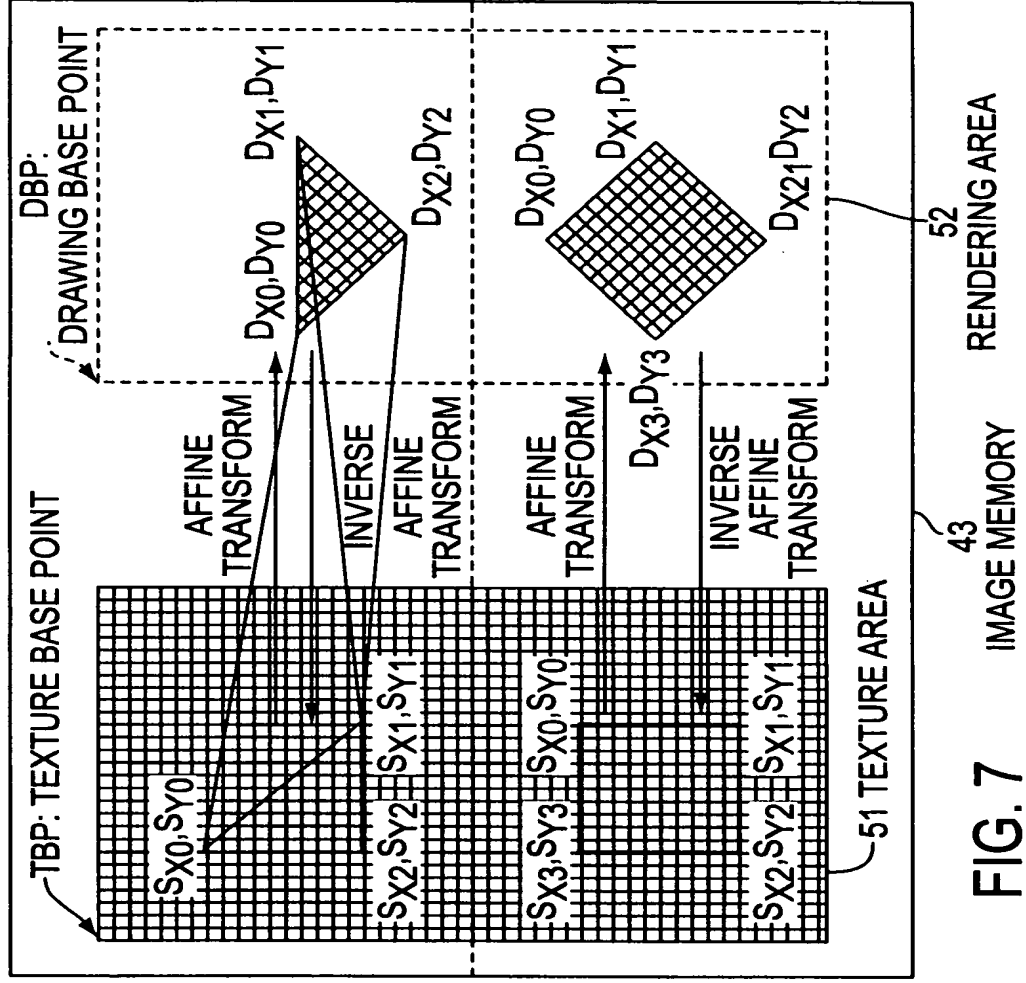


FIG. 7

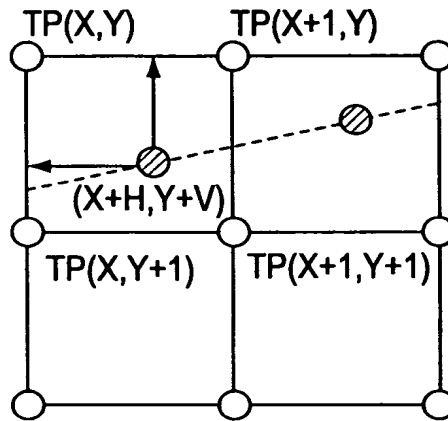


FIG. 8

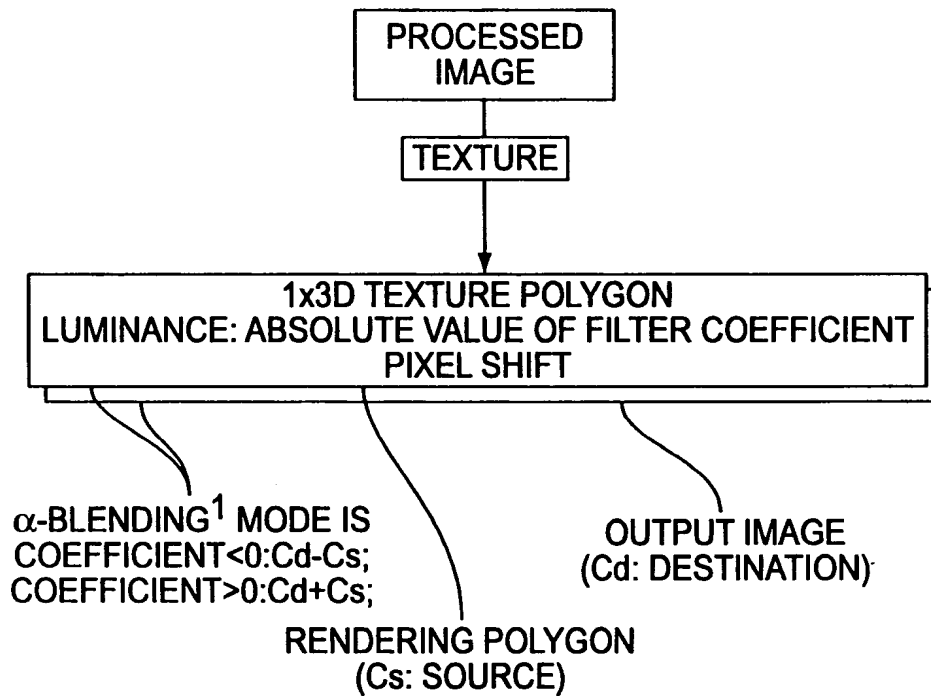


FIG. 9

		m		
		0	1	2
n	0	C_{00} (1,1)	C_{01} (0,1)	C_{02} (-1,1)
	1	C_{10} (1,0)	C_{11} (0,0)	C_{12} (-1,0)
	2	C_{20} (1,-1)	C_{21} (0,-1)	C_{22} (-1,-1)

CONVOLUTION FILTER COEFFICIENT

FIG. 11

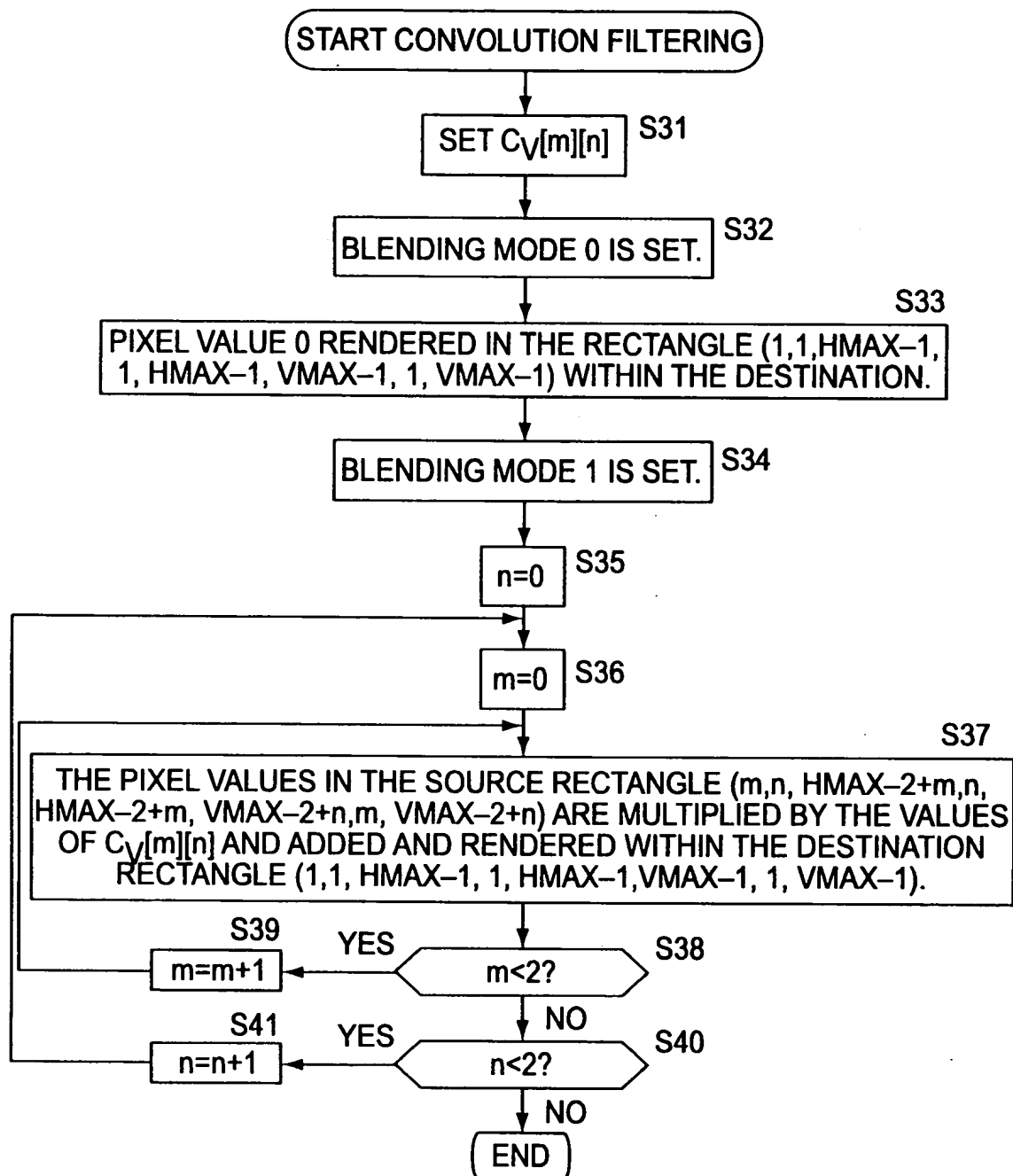


FIG. 12

		0	1	2	3	4	5 (HMAX-1)
j	0						
	1		0	0	0	0	0
	2		0	0	0	0	0
	3		0	0	0	0	0
	4		0	0	0	0	0
	5 (VMAX-1)		0	0	0	0	0

FIG. 13

		C_{dp}					
		0	1	2	3	4	5 ($HMAX-1$)
0							
1		$C_{sp00}XC_{00}$	$C_{sp10}XC_{00}$	$C_{sp20}XC_{00}$	$C_{sp30}XC_{00}$	$C_{sp40}XC_{00}$	
2		$C_{sp01}XC_{00}$	$C_{sp11}XC_{00}$	$C_{sp21}XC_{00}$	$C_{sp31}XC_{00}$	$C_{sp41}XC_{00}$	
3		$C_{sp02}XC_{00}$	$C_{sp12}XC_{00}$	$C_{sp22}XC_{00}$	$C_{sp32}XC_{00}$	$C_{sp42}XC_{00}$	
4		$C_{sp03}XC_{00}$	$C_{sp13}XC_{00}$	$C_{sp23}XC_{00}$	$C_{sp33}XC_{00}$	$C_{sp43}XC_{00}$	
5 ($VMAX-1$)		$C_{sp04}XC_{00}$	$C_{sp14}XC_{00}$	$C_{sp24}XC_{00}$	$C_{sp34}XC_{00}$	$C_{sp44}XC_{00}$	

FIG. 14

		C_{dp}					
		0	1	2	3	4	5 ($HMAX-1$)
0							
1		$C_{sp00}XC_{00}$ $+C_{sp10}XC_{10}$	$C_{sp10}XC_{00}$ $+C_{sp20}XC_{10}$	$C_{sp20}XC_{00}$ $+C_{sp30}XC_{10}$	$C_{sp30}XC_{00}$ $+C_{sp40}XC_{10}$	$C_{sp40}XC_{00}$ $+C_{sp50}XC_{10}$	
2		$C_{sp01}XC_{00}$ $+C_{sp11}XC_{10}$	$C_{sp11}XC_{00}$ $+C_{sp21}XC_{10}$	$C_{sp21}XC_{00}$ $+C_{sp31}XC_{10}$	$C_{sp31}XC_{00}$ $+C_{sp41}XC_{10}$	$C_{sp41}XC_{00}$ $+C_{sp51}XC_{10}$	
3		$C_{sp02}XC_{00}$ $+C_{sp12}XC_{10}$	$C_{sp12}XC_{00}$ $+C_{sp22}XC_{10}$	$C_{sp22}XC_{00}$ $+C_{sp32}XC_{10}$	$C_{sp32}XC_{00}$ $+C_{sp42}XC_{10}$	$C_{sp42}XC_{00}$ $+C_{sp52}XC_{10}$	
4		$C_{sp03}XC_{00}$ $+C_{sp13}XC_{10}$	$C_{sp13}XC_{00}$ $+C_{sp23}XC_{10}$	$C_{sp23}XC_{00}$ $+C_{sp33}XC_{10}$	$C_{sp33}XC_{00}$ $+C_{sp43}XC_{10}$	$C_{sp43}XC_{00}$ $+C_{sp53}XC_{10}$	
5 ($VMAX-1$)		$C_{sp04}XC_{00}$ $+C_{sp14}XC_{10}$	$C_{sp14}XC_{00}$ $+C_{sp24}XC_{10}$	$C_{sp24}XC_{00}$ $+C_{sp34}XC_{10}$	$C_{sp34}XC_{00}$ $+C_{sp44}XC_{10}$	$C_{sp44}XC_{00}$ $+C_{sp54}XC_{10}$	

FIG. 15

		C_{dp}					
		0	1	2	3	4	5 (HMAX-1)
j	0						
	1	$C_{sp00}XC_{00}$ $+C_{sp10}XC_{10}$ $+C_{sp20}XC_{20}$	$C_{sp10}XC_{00}$ $+C_{sp20}XC_{10}$ $+C_{sp30}XC_{20}$	$C_{sp20}XC_{00}$ $+C_{sp30}XC_{10}$ $+C_{sp40}XC_{20}$	$C_{sp30}XC_{00}$ $+C_{sp40}XC_{10}$ $+C_{sp50}XC_{20}$	$C_{sp40}XC_{00}$ $+C_{sp50}XC_{10}$	
	2	$C_{sp01}XC_{00}$ $+C_{sp11}XC_{10}$ $+C_{sp21}XC_{20}$	$C_{sp11}XC_{00}$ $+C_{sp21}XC_{10}$ $+C_{sp31}XC_{20}$	$C_{sp21}XC_{00}$ $+C_{sp31}XC_{10}$ $+C_{sp41}XC_{20}$	$C_{sp31}XC_{00}$ $+C_{sp41}XC_{10}$ $+C_{sp51}XC_{20}$	$C_{sp41}XC_{00}$ $+C_{sp51}XC_{10}$	
	3	$C_{sp02}XC_{00}$ $+C_{sp12}XC_{10}$ $+C_{sp22}XC_{20}$	$C_{sp12}XC_{00}$ $+C_{sp22}XC_{10}$ $+C_{sp32}XC_{20}$	$C_{sp22}XC_{00}$ $+C_{sp32}XC_{10}$ $+C_{sp42}XC_{20}$	$C_{sp32}XC_{00}$ $+C_{sp42}XC_{10}$ $+C_{sp52}XC_{20}$	$C_{sp42}XC_{00}$ $+C_{sp52}XC_{10}$	
	4	$C_{sp03}XC_{00}$ $+C_{sp13}XC_{10}$ $+C_{sp23}XC_{20}$	$C_{sp13}XC_{00}$ $+C_{sp23}XC_{10}$ $+C_{sp33}XC_{20}$	$C_{sp23}XC_{00}$ $+C_{sp33}XC_{10}$ $+C_{sp43}XC_{20}$	$C_{sp33}XC_{00}$ $+C_{sp43}XC_{10}$ $+C_{sp53}XC_{20}$	$C_{sp43}XC_{00}$ $+C_{sp53}XC_{10}$	
	5 (VMAX-1)	$C_{sp04}XC_{00}$ $+C_{sp14}XC_{10}$ $+C_{sp24}XC_{20}$	$C_{sp14}XC_{00}$ $+C_{sp24}XC_{10}$ $+C_{sp34}XC_{20}$	$C_{sp24}XC_{00}$ $+C_{sp34}XC_{10}$ $+C_{sp44}XC_{20}$	$C_{sp34}XC_{00}$ $+C_{sp44}XC_{10}$ $+C_{sp54}XC_{20}$	$C_{sp44}XC_{00}$ $+C_{sp54}XC_{10}$	

FIG. 16

		C_{dp}					
		0	1	2	3	4	5 (HMAX-1)
j	0						
	1		$C_{sp00}XC_{00}$ $+C_{sp10}XC_{10}$ $+C_{sp20}XC_{20}$ $+C_{sp01}XC_{01}$	$C_{sp10}XC_{00}$ $+C_{sp20}XC_{10}$ $+C_{sp30}XC_{20}$ $+C_{sp11}XC_{01}$	$C_{sp20}XC_{00}$ $+C_{sp30}XC_{10}$ $+C_{sp40}XC_{20}$ $+C_{sp21}XC_{01}$	$C_{sp30}XC_{00}$ $+C_{sp40}XC_{10}$ $+C_{sp50}XC_{20}$ $+C_{sp31}XC_{01}$	$C_{sp40}XC_{00}$ $+C_{sp50}XC_{10}$ $+C_{sp41}XC_{01}$
	2		$C_{sp01}XC_{00}$ $+C_{sp11}XC_{10}$ $+C_{sp21}XC_{20}$ $+C_{sp02}XC_{01}$	$C_{sp11}XC_{00}$ $+C_{sp21}XC_{10}$ $+C_{sp31}XC_{20}$ $+C_{sp12}XC_{01}$	$C_{sp21}XC_{00}$ $+C_{sp31}XC_{10}$ $+C_{sp41}XC_{20}$ $+C_{sp22}XC_{01}$	$C_{sp31}XC_{00}$ $+C_{sp41}XC_{10}$ $+C_{sp51}XC_{20}$ $+C_{sp32}XC_{01}$	$C_{sp41}XC_{00}$ $+C_{sp51}XC_{10}$ $+C_{sp42}XC_{01}$
	3		$C_{sp02}XC_{00}$ $+C_{sp12}XC_{10}$ $+C_{sp22}XC_{20}$ $+C_{sp03}XC_{01}$	$C_{sp12}XC_{00}$ $+C_{sp22}XC_{10}$ $+C_{sp32}XC_{20}$ $+C_{sp13}XC_{01}$	$C_{sp22}XC_{00}$ $+C_{sp32}XC_{10}$ $+C_{sp42}XC_{20}$ $+C_{sp23}XC_{01}$	$C_{sp32}XC_{00}$ $+C_{sp42}XC_{10}$ $+C_{sp52}XC_{20}$ $+C_{sp33}XC_{01}$	$C_{sp42}XC_{00}$ $+C_{sp52}XC_{10}$ $+C_{sp43}XC_{01}$
	4		$C_{sp03}XC_{00}$ $+C_{sp13}XC_{10}$ $+C_{sp23}XC_{20}$ $+C_{sp04}XC_{01}$	$C_{sp13}XC_{00}$ $+C_{sp23}XC_{10}$ $+C_{sp33}XC_{20}$ $+C_{sp14}XC_{01}$	$C_{sp23}XC_{00}$ $+C_{sp33}XC_{10}$ $+C_{sp43}XC_{20}$ $+C_{sp24}XC_{01}$	$C_{sp33}XC_{00}$ $+C_{sp43}XC_{10}$ $+C_{sp53}XC_{20}$ $+C_{sp34}XC_{01}$	$C_{sp43}XC_{00}$ $+C_{sp53}XC_{10}$ $+C_{sp44}XC_{01}$
	5 (VMAX-1)		$C_{sp04}XC_{00}$ $+C_{sp14}XC_{10}$ $+C_{sp24}XC_{20}$ $+C_{sp05}XC_{01}$	$C_{sp14}XC_{00}$ $+C_{sp24}XC_{10}$ $+C_{sp34}XC_{20}$ $+C_{sp15}XC_{01}$	$C_{sp24}XC_{00}$ $+C_{sp34}XC_{10}$ $+C_{sp44}XC_{20}$ $+C_{sp25}XC_{01}$	$C_{sp34}XC_{00}$ $+C_{sp44}XC_{10}$ $+C_{sp54}XC_{20}$ $+C_{sp35}XC_{01}$	$C_{sp44}XC_{00}$ $+C_{sp54}XC_{10}$ $+C_{sp45}XC_{01}$

FIG. 17

		C_{dp}					
		0	1	2	3	4	5 (HMAX-1)
j	0						
	1		$C_{sp00}XC_{00}$ $+C_{sp10}XC_{10}$ $+C_{sp20}XC_{20}$ $+C_{sp01}XC_{01}$ \vdots $+C_{sp22}XC_{22}$	$C_{sp10}XC_{00}$ $+C_{sp20}XC_{10}$ $+C_{sp30}XC_{20}$ $+C_{sp11}XC_{01}$ \vdots $+C_{sp32}XC_{22}$	$C_{sp20}XC_{00}$ $+C_{sp30}XC_{10}$ $+C_{sp40}XC_{20}$ $+C_{sp21}XC_{01}$ \vdots $+C_{sp42}XC_{22}$	$C_{sp30}XC_{00}$ $+C_{sp40}XC_{10}$ $+C_{sp50}XC_{20}$ $+C_{sp31}XC_{01}$ \vdots $+C_{sp52}XC_{22}$	$C_{sp40}XC_{00}$ $+C_{sp50}XC_{10}$ \vdots $+C_{sp41}XC_{01}$ \vdots
	2		$C_{sp01}XC_{00}$ $+C_{sp11}XC_{10}$ $+C_{sp21}XC_{20}$ $+C_{sp02}XC_{01}$ \vdots $+C_{sp23}XC_{22}$	$C_{sp11}XC_{00}$ $+C_{sp21}XC_{10}$ $+C_{sp31}XC_{20}$ $+C_{sp12}XC_{01}$ \vdots $+C_{sp33}XC_{22}$	$C_{sp21}XC_{00}$ $+C_{sp31}XC_{10}$ $+C_{sp41}XC_{20}$ $+C_{sp22}XC_{01}$ \vdots $+C_{sp43}XC_{22}$	$C_{sp31}XC_{00}$ $+C_{sp41}XC_{10}$ $+C_{sp51}XC_{20}$ $+C_{sp32}XC_{01}$ \vdots $+C_{sp53}XC_{22}$	$C_{sp41}XC_{00}$ $+C_{sp51}XC_{10}$ \vdots $+C_{sp42}XC_{01}$ \vdots
	3		$C_{sp02}XC_{00}$ $+C_{sp12}XC_{10}$ $+C_{sp22}XC_{20}$ $+C_{sp03}XC_{01}$ \vdots $+C_{sp24}XC_{22}$	$C_{sp12}XC_{00}$ $+C_{sp22}XC_{10}$ $+C_{sp32}XC_{20}$ $+C_{sp13}XC_{01}$ \vdots $+C_{sp34}XC_{22}$	$C_{sp22}XC_{00}$ $+C_{sp32}XC_{10}$ $+C_{sp42}XC_{20}$ $+C_{sp23}XC_{01}$ \vdots $+C_{sp44}XC_{22}$	$C_{sp32}XC_{00}$ $+C_{sp42}XC_{10}$ $+C_{sp52}XC_{20}$ $+C_{sp33}XC_{01}$ \vdots $+C_{sp54}XC_{22}$	$C_{sp42}XC_{00}$ $+C_{sp52}XC_{10}$ \vdots $+C_{sp43}XC_{01}$ \vdots
	4		$C_{sp03}XC_{00}$ $+C_{sp13}XC_{10}$ $+C_{sp23}XC_{20}$ $+C_{sp04}XC_{01}$ \vdots $+C_{sp25}XC_{22}$	$C_{sp13}XC_{00}$ $+C_{sp23}XC_{10}$ $+C_{sp33}XC_{20}$ $+C_{sp14}XC_{01}$ \vdots $+C_{sp35}XC_{22}$	$C_{sp23}XC_{00}$ $+C_{sp33}XC_{10}$ $+C_{sp43}XC_{20}$ $+C_{sp24}XC_{01}$ \vdots $+C_{sp45}XC_{22}$	$C_{sp33}XC_{00}$ $+C_{sp43}XC_{10}$ $+C_{sp53}XC_{20}$ $+C_{sp34}XC_{01}$ \vdots $+C_{sp55}XC_{22}$	$C_{sp43}XC_{00}$ $+C_{sp53}XC_{10}$ \vdots $+C_{sp44}XC_{01}$ \vdots
	5 (VMAX-1)		$C_{sp04}XC_{00}$ $+C_{sp14}XC_{10}$ $+C_{sp24}XC_{20}$ $+C_{sp05}XC_{01}$ \vdots	$C_{sp14}XC_{00}$ $+C_{sp24}XC_{10}$ $+C_{sp34}XC_{20}$ $+C_{sp15}XC_{01}$ \vdots	$C_{sp24}XC_{00}$ $+C_{sp34}XC_{10}$ $+C_{sp44}XC_{20}$ $+C_{sp25}XC_{01}$ \vdots	$C_{sp34}XC_{00}$ $+C_{sp44}XC_{10}$ $+C_{sp54}XC_{20}$ $+C_{sp35}XC_{01}$ \vdots	$C_{sp44}XC_{00}$ $+C_{sp54}XC_{10}$ \vdots $+C_{sp45}XC_{01}$ \vdots

FIG 18

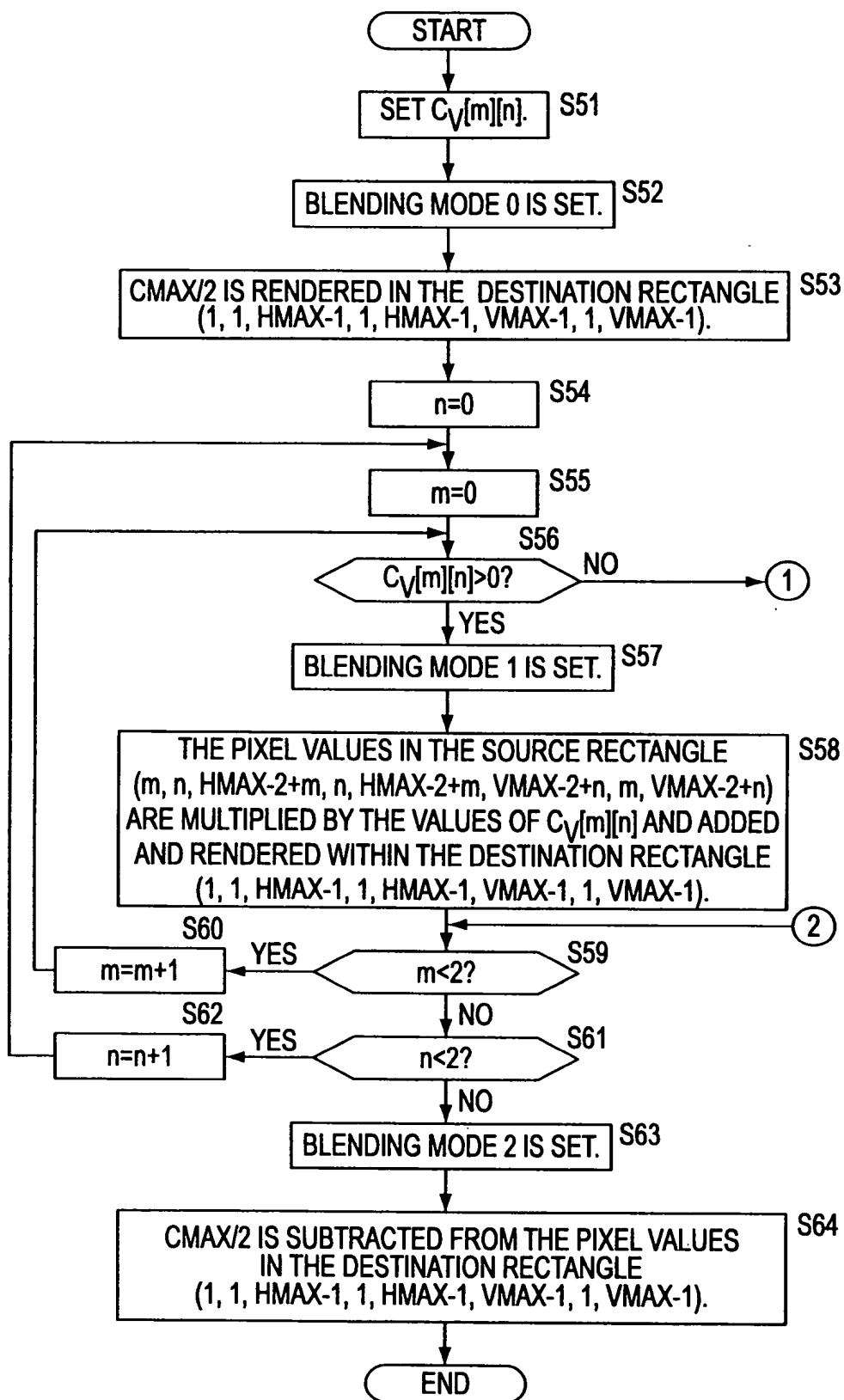


FIG. 19

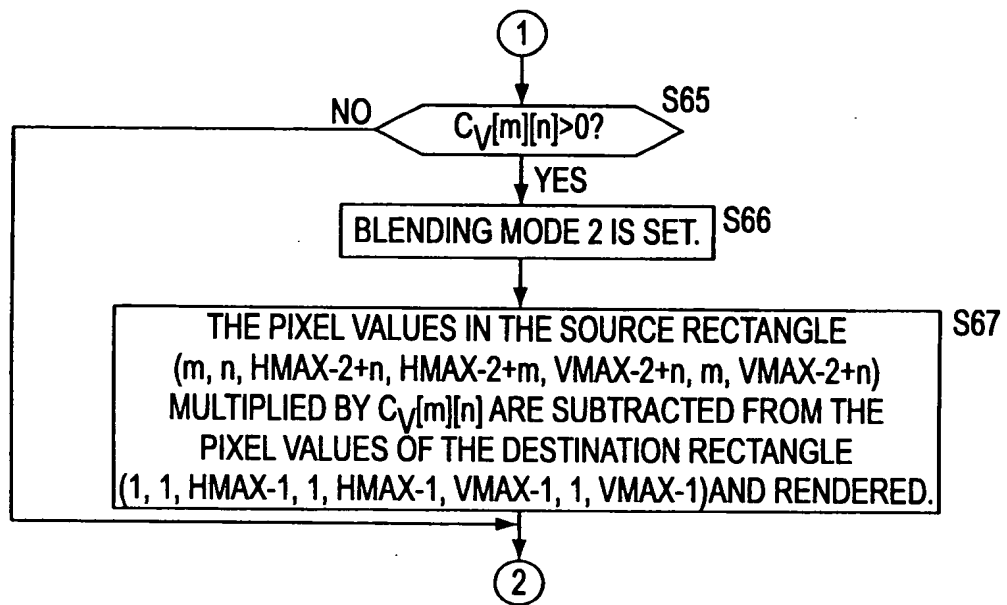


FIG. 20

		C_{dp}					
		0	1	2	3	4	5 (HMAX-1)
j	0						
	1		$\frac{C_{MAX}}{2}$	$\frac{C_{MAX}}{2}$	$\frac{C_{MAX}}{2}$	$\frac{C_{MAX}}{2}$	$\frac{C_{MAX}}{2}$
	2		$\frac{C_{MAX}}{2}$	$\frac{C_{MAX}}{2}$	$\frac{C_{MAX}}{2}$	$\frac{C_{MAX}}{2}$	$\frac{C_{MAX}}{2}$
	3		$\frac{C_{MAX}}{2}$	$\frac{C_{MAX}}{2}$	$\frac{C_{MAX}}{2}$	$\frac{C_{MAX}}{2}$	$\frac{C_{MAX}}{2}$
	4		$\frac{C_{MAX}}{2}$	$\frac{C_{MAX}}{2}$	$\frac{C_{MAX}}{2}$	$\frac{C_{MAX}}{2}$	$\frac{C_{MAX}}{2}$
	5 (VMAX-1)		$\frac{C_{MAX}}{2}$	$\frac{C_{MAX}}{2}$	$\frac{C_{MAX}}{2}$	$\frac{C_{MAX}}{2}$	$\frac{C_{MAX}}{2}$

FIG. 21

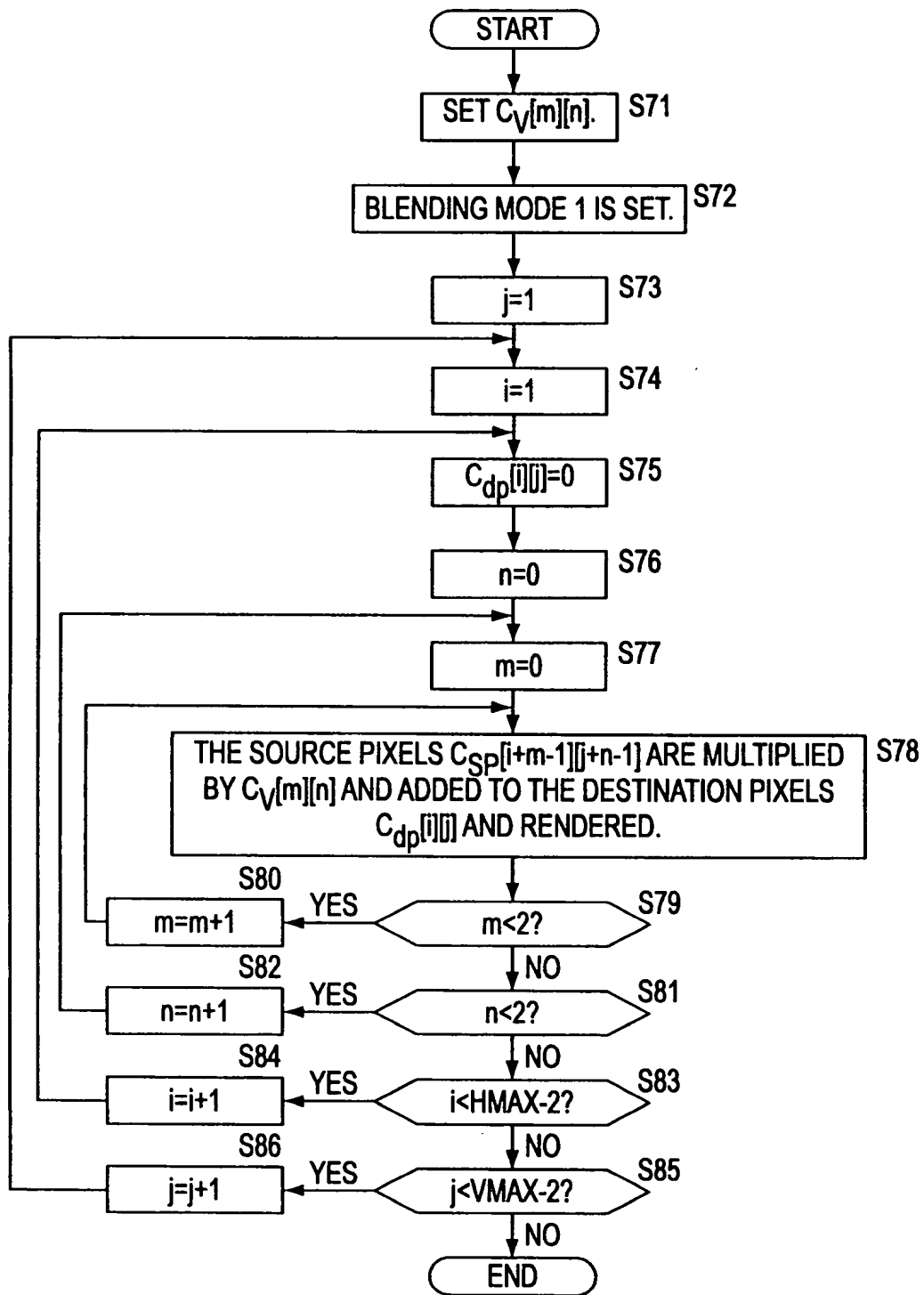


FIG. 22

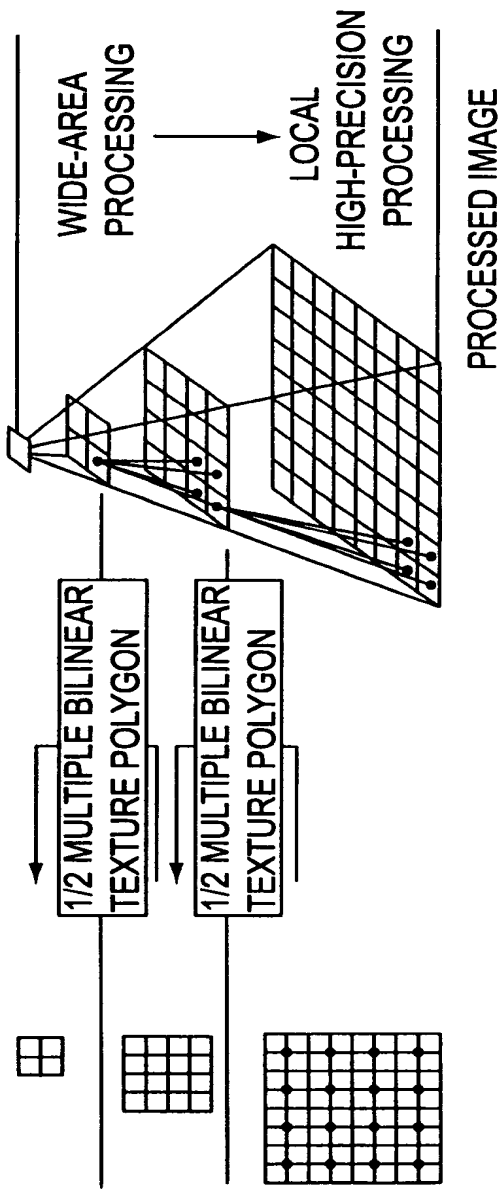


FIG. 23

09345713 052099

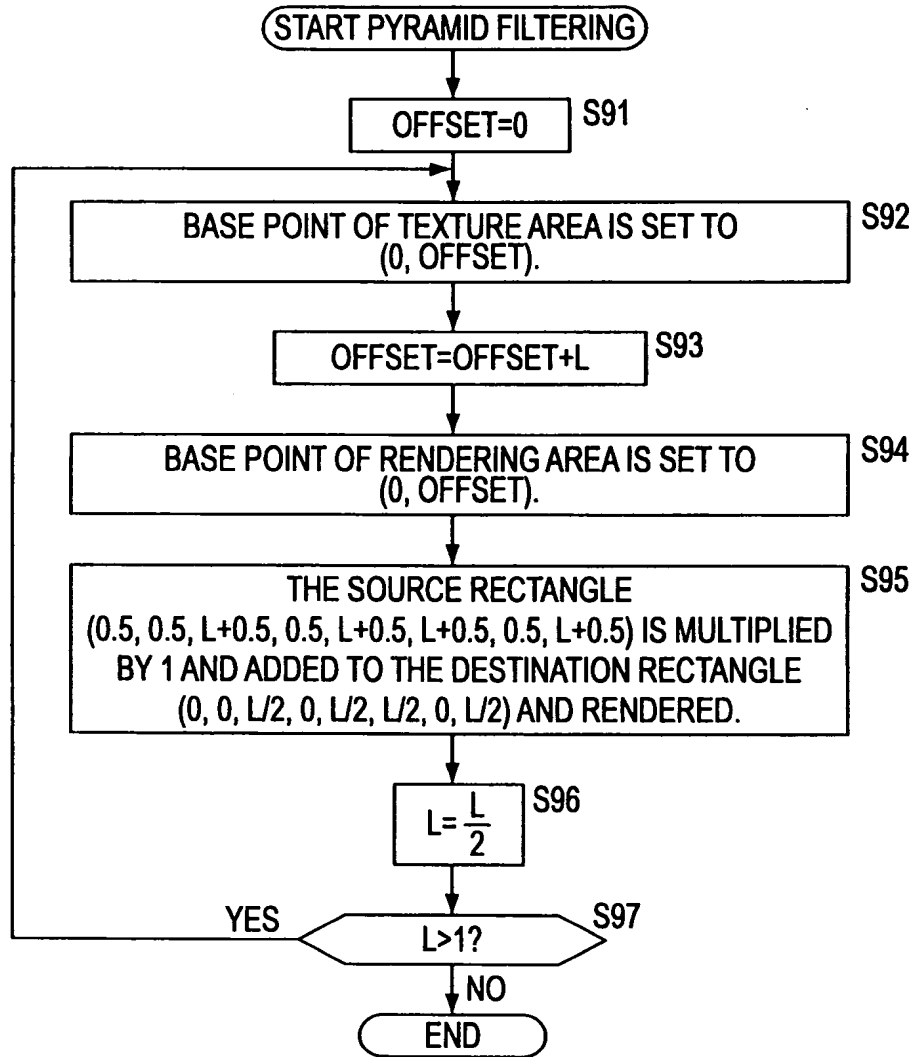


FIG. 24

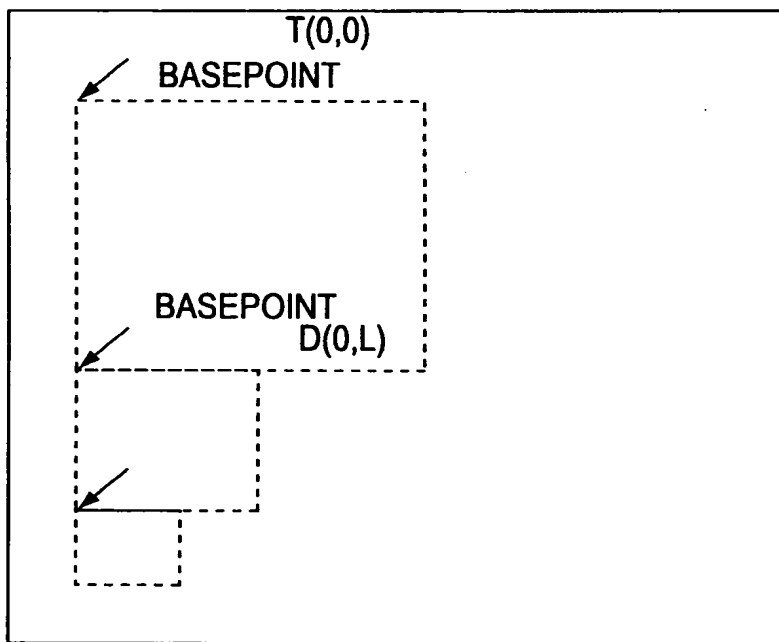
[illegible]

FIG. 25

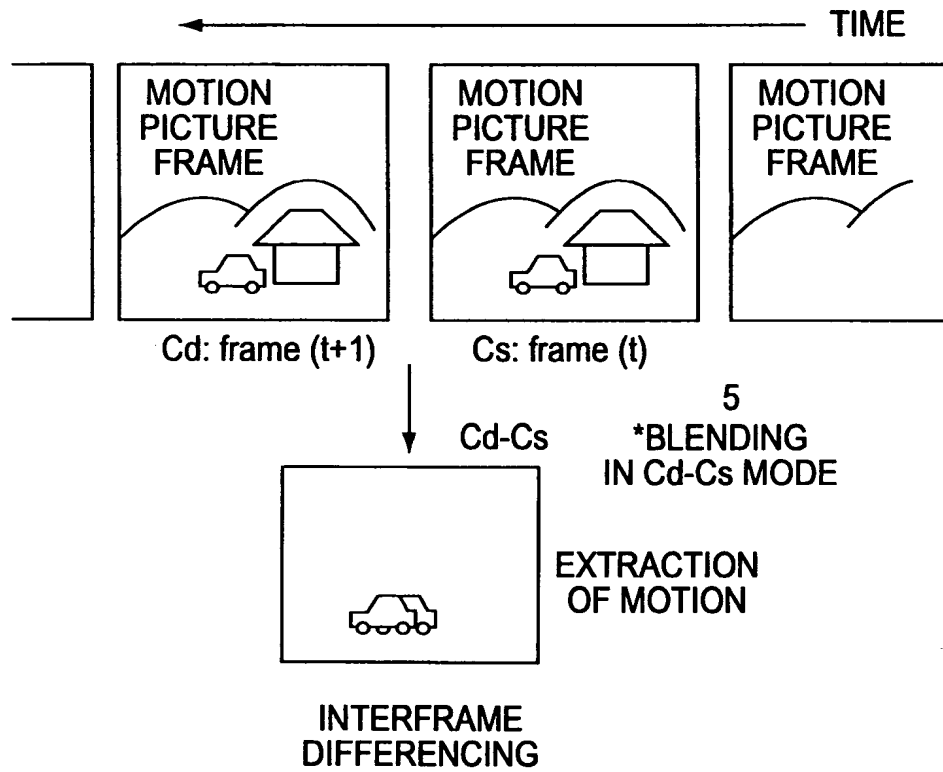


FIG. 26

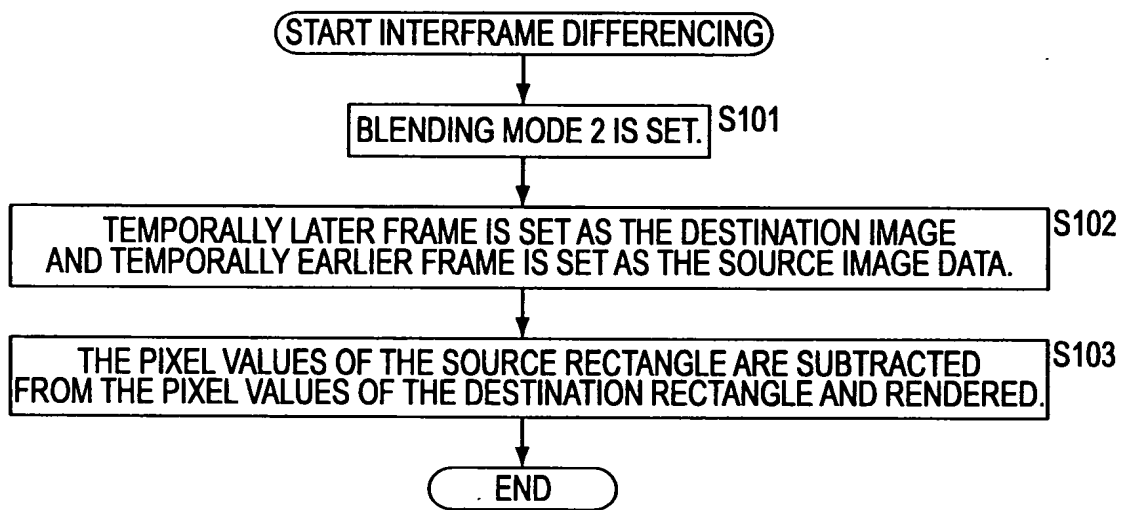


FIG. 27

IMAGE A

IMAGE B

ABSOLUTE VALUE OF
DIFFERENCES IS TAKEN:

CLAMPED
DIFFERENCE
IMAGE A-B

+

CLAMPED
DIFFERENCE
IMAGE B-A

=

ABSOLUTE-VALUE
DIFFERENCE
IMAGE A-B

SUM TOTAL BY
PYRAMID FILTER
(DYNAMIC RANGE
COMPENSATION BY
LUMINANCE CONTROL):

ABSOLUTE-VALUE
DIFFERENCE
IMAGE A-B



SUM TOTAL
(AVERAGE VALUE)
= INTERIMAGE
DISTANCE

FIG. 28

START INTERIMAGE DISTANCE COMPUTATION

FIRST IMAGE IS SET AS DESTINATION AND SECOND
IMAGE IS SET AS SOURCE.

S111

BLENDING MODE 2 IS SET.

S112

PIXEL VALUES OF THE SOURCE ARE SUBTRACTED FROM THE PIXEL VALUES OF THE DESTINATION, CLAMPED AND RENDERED IN THE FIRST DISTANCE IMAGE AREA.

7S113

**SECOND IMAGE IS SET AS DESTINATION AND FIRST
IMAGE IS SET AS SOURCE.**

7S114

BLENDING MODE 2 IS SET.

7S115

PIXEL VALUES OF THE SOURCE ARE SUBTRACTED FROM THE PIXEL VALUES OF THE DESTINATION, CLAMPED AND RENDERED IN THE FIRST DISTANCE IMAGE AREA.

7S116

IMAGE IN FIRST DISTANCE IMAGE AREA IS SET AS
DESTINATION AND IMAGE IN SECOND DISTANCE IMAGE
AREA IS SET AS SOURCE.

S117

BLENDING MODE 1 IS SET.

7S118

PIXEL VALUES OF THE SOURCE ARE ADDED TO THE
PIXEL VALUES OF THE DESTINATION, AND RENDERED.

7S119

PYRAMID FILTERING.

7S120

END

FIG. 29

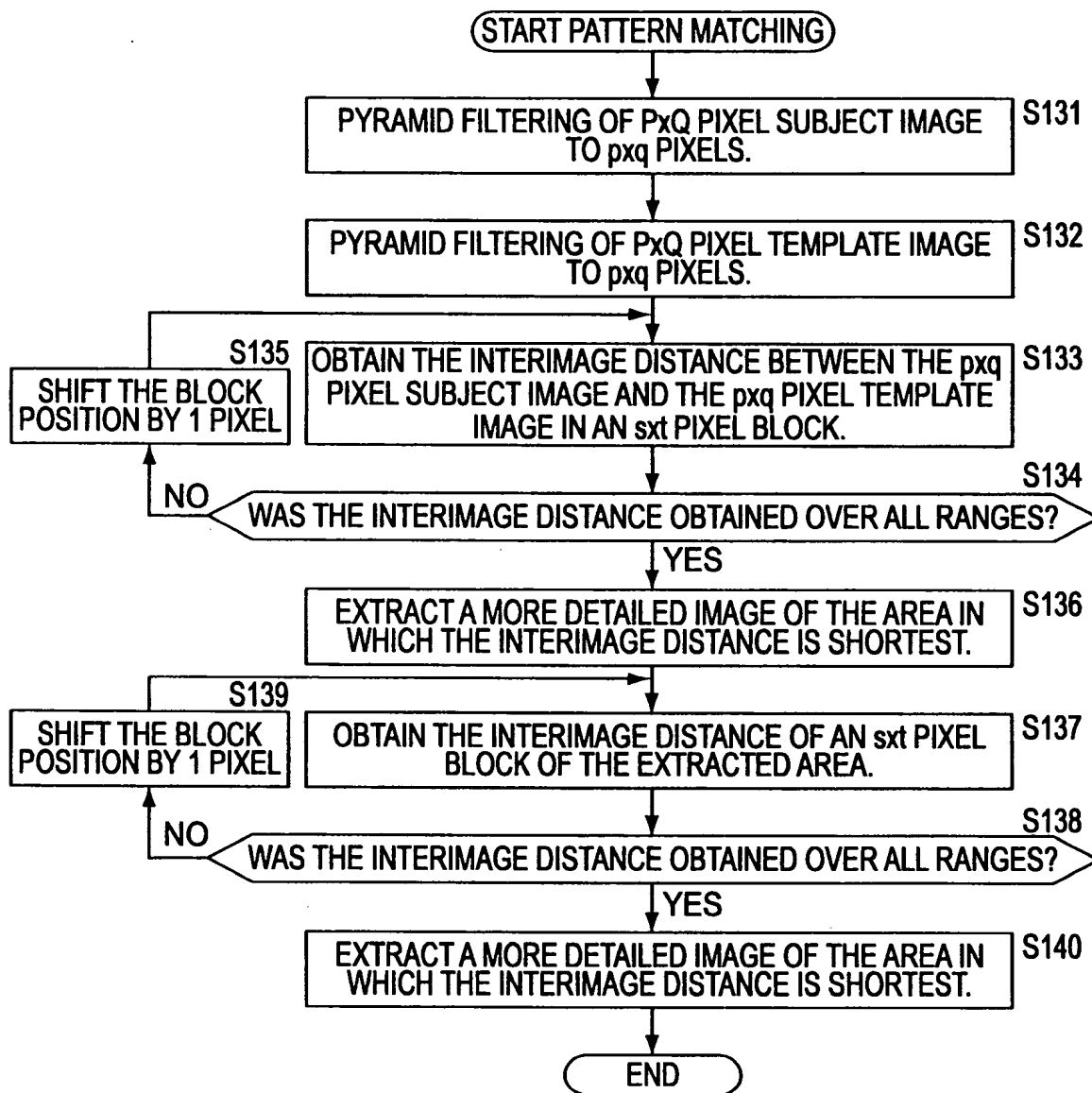


FIG. 30

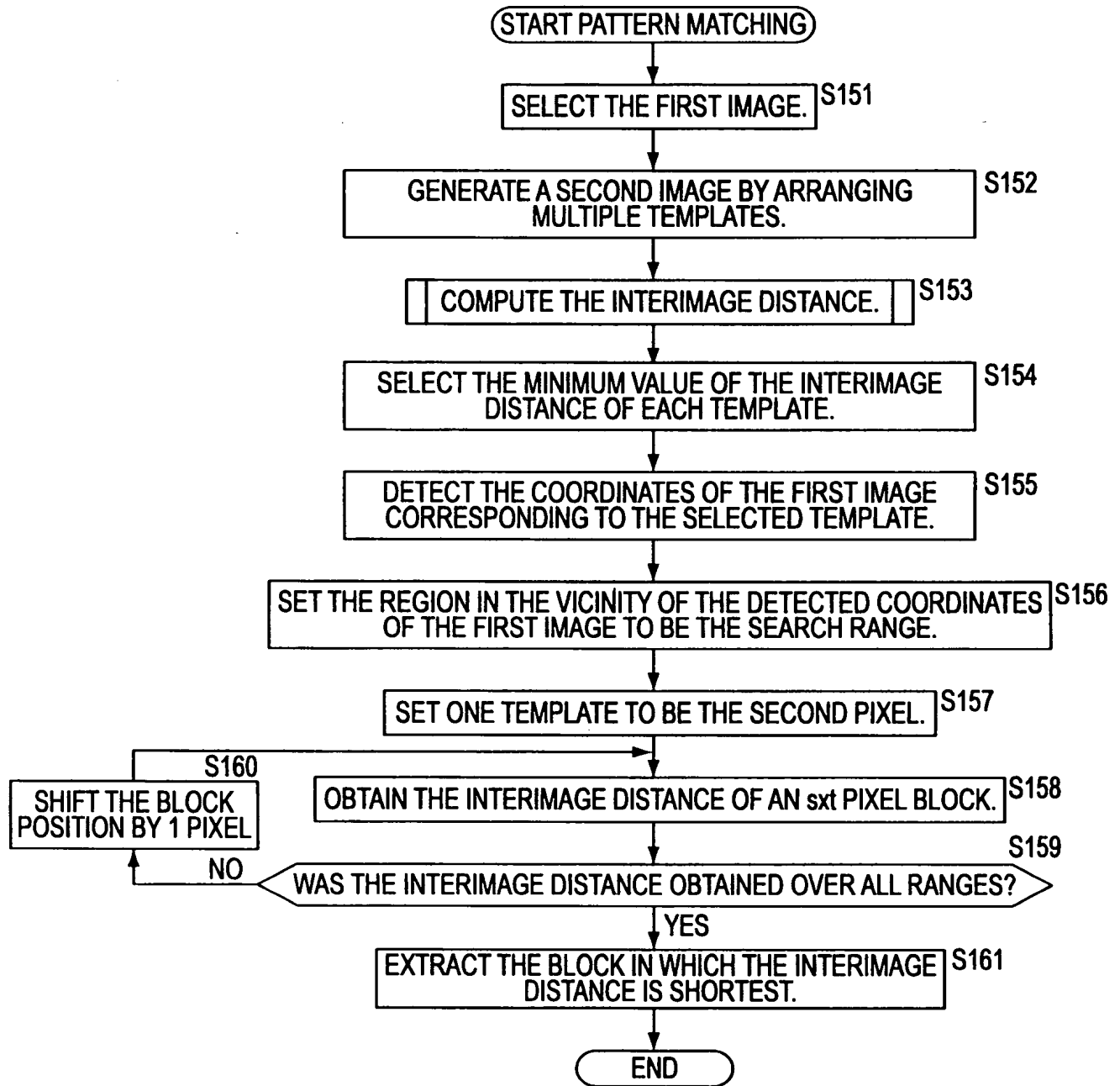


FIG. 31

650250" 2424260

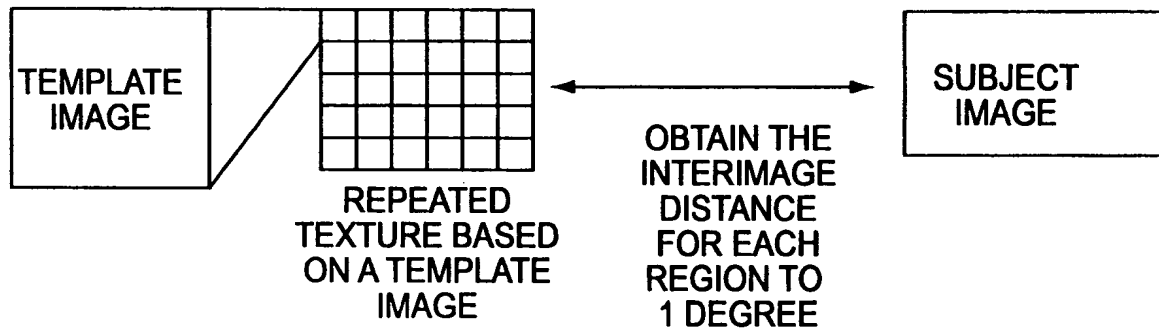


FIG. 32

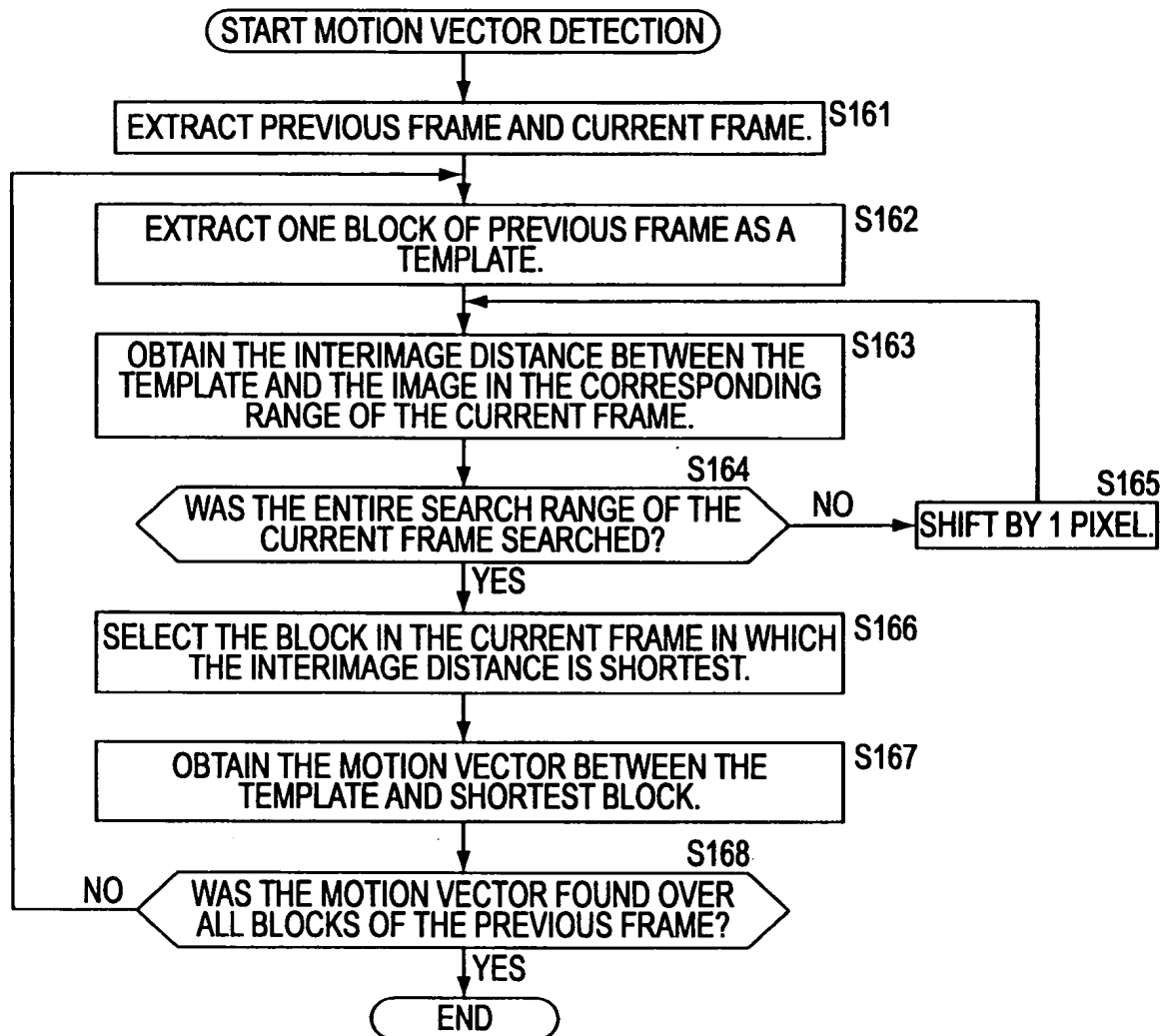


FIG. 33

Diagram illustrating the motion vector extraction process:

- A camera (35) captures a **CURRENT FRAME** and a **PREVIOUS FRAME**.
- The frames are processed by a **MOTION VECTOR EXTRACTION** block (43).
- The output is a grid of **MOTION VECTORS**, represented by arrows indicating movement from the current frame to the previous frame.

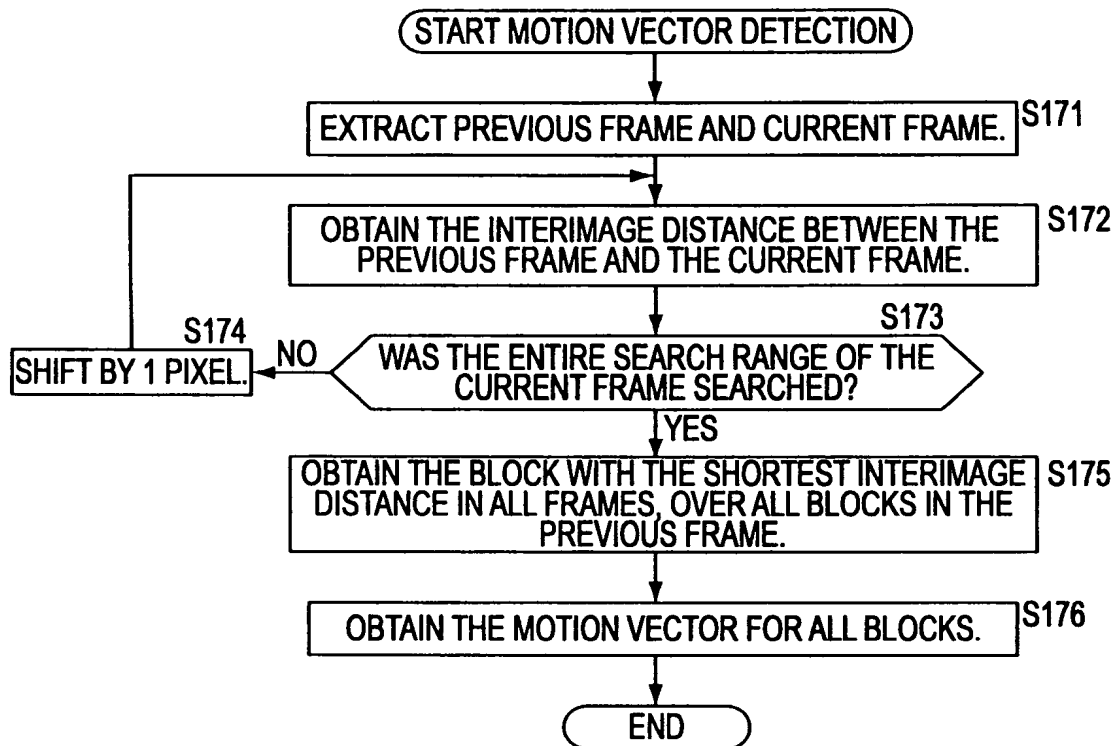


FIG. 36

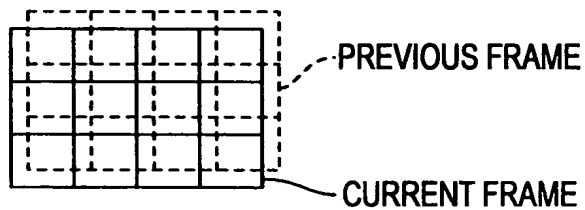


FIG. 37

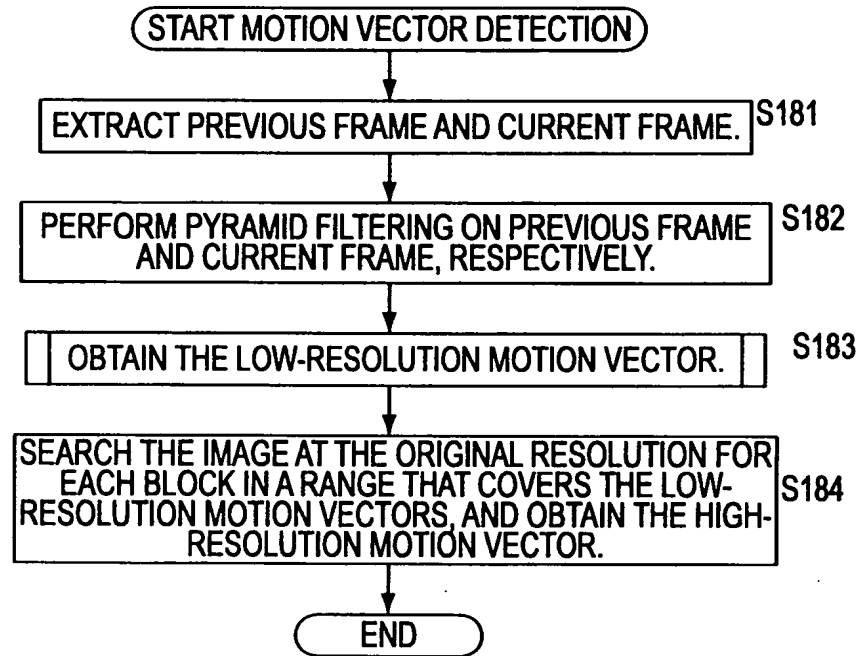


FIG. 38

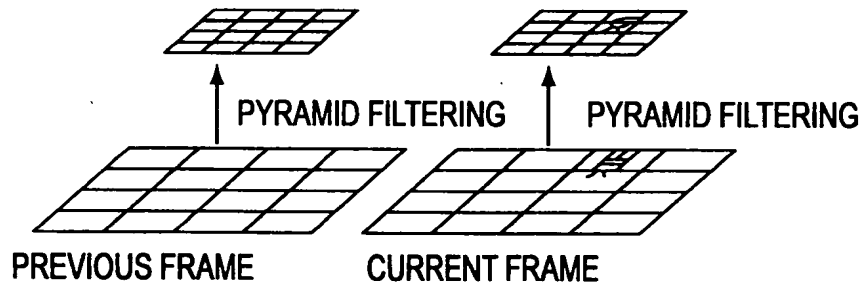


FIG. 39

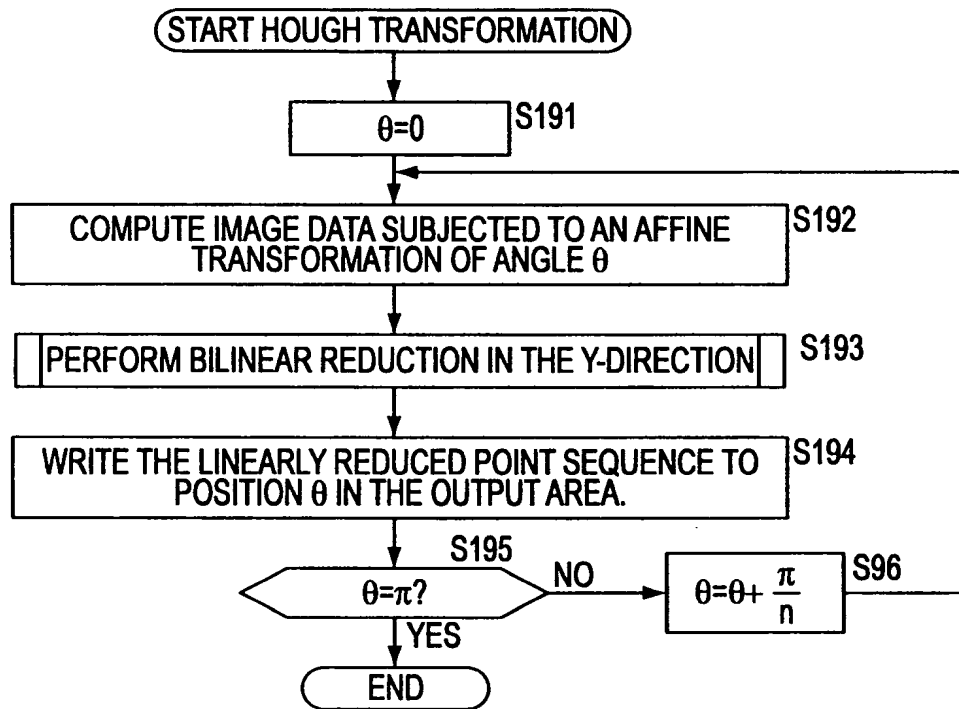


FIG. 40



FIG. 41

```

graph TD
    Start([START BILINEAR REDUCTION IN THE y-DIRECTION]) --> S201[L=L0, OFFSET=0 S201]
    S201 --> S202[BASE POINT OF TEXTURE AREA IS SET TO (0, OFFSET). S202]
    S202 --> S203[BASE POINT OF RENDERING AREA IS SET TO (0, OFFSET). S203]
    S203 --> S205[THE SOURCE RECTANGLE (0, 0.5, L0, 0.5, L0, L+0.5, 0, L+0.5) IS MULTIPLIED BY 1 AND ADDED TO THE DESTINATION RECTANGLE (0.0, L0, 0, L0, L/2, 0, L/2) AND RENDERED. S205]
    S205 --> S206[L = L/2 S206]
    S206 --> S207{L > 1? S207}
    S207 -- YES --> S202
    S207 -- NO --> End([END])
  
```

FIG. 42

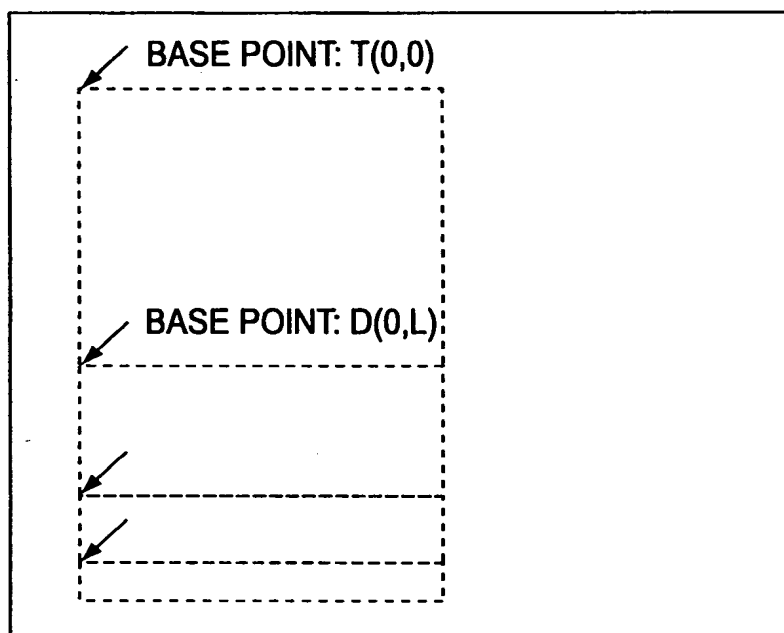


FIG. 43

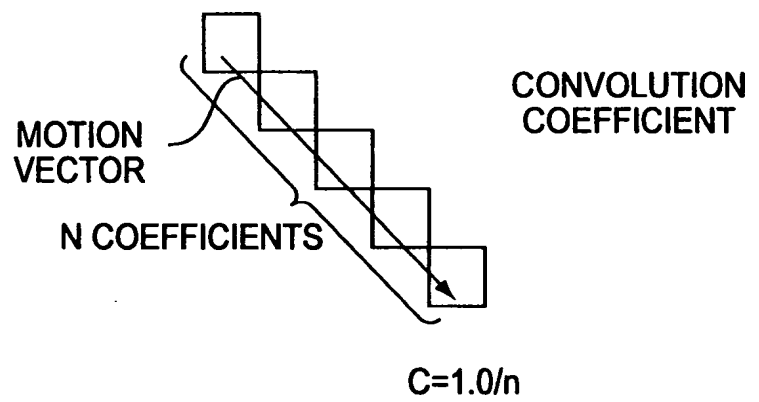
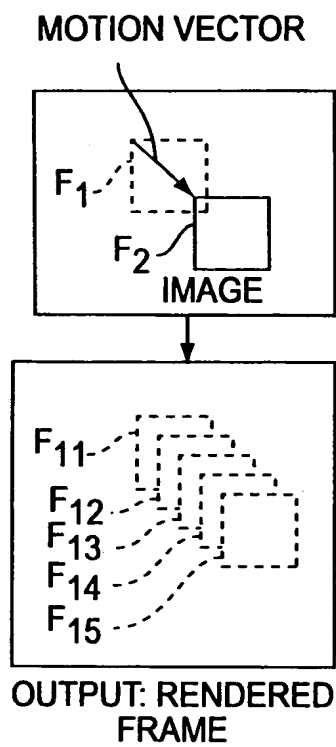


FIG. 44

The diagram illustrates a system for generating a motion-blurred image. A camera, labeled 35, captures a **CURRENT FRAME** and a **PREVIOUS FRAME**. These frames are processed by a block labeled **EXTRACTION OF MOTION VECTORS**, which outputs a grid of **MOTION VECTORS**. Each vector is represented by an arrow indicating direction and magnitude. These vectors are then used in a process labeled **MOTION BLURRING** to generate the **OUTPUT IMAGE**, which is a blurred version of the current frame.

The diagram illustrates a motion vector field. A large rectangle represents the image frame. Inside, a smaller dashed rectangle represents a region of interest. A solid arrow labeled "MOTION VECTOR" points from the left edge of the frame to the center of the dashed rectangle. To the right of the frame, two groups of labels are shown: F_{21} and F_{22} are grouped by a bracket labeled F_1 and "PREVIOUS FRAME"; F_{23} and F_{24} are grouped by a bracket labeled F_2 and "CURRENT FRAME". Dashed lines connect the corners of the dashed rectangle to these labels: F_{21} and F_{22} to the top corners, and F_{23} and F_{24} to the bottom corners.

FIG. 47

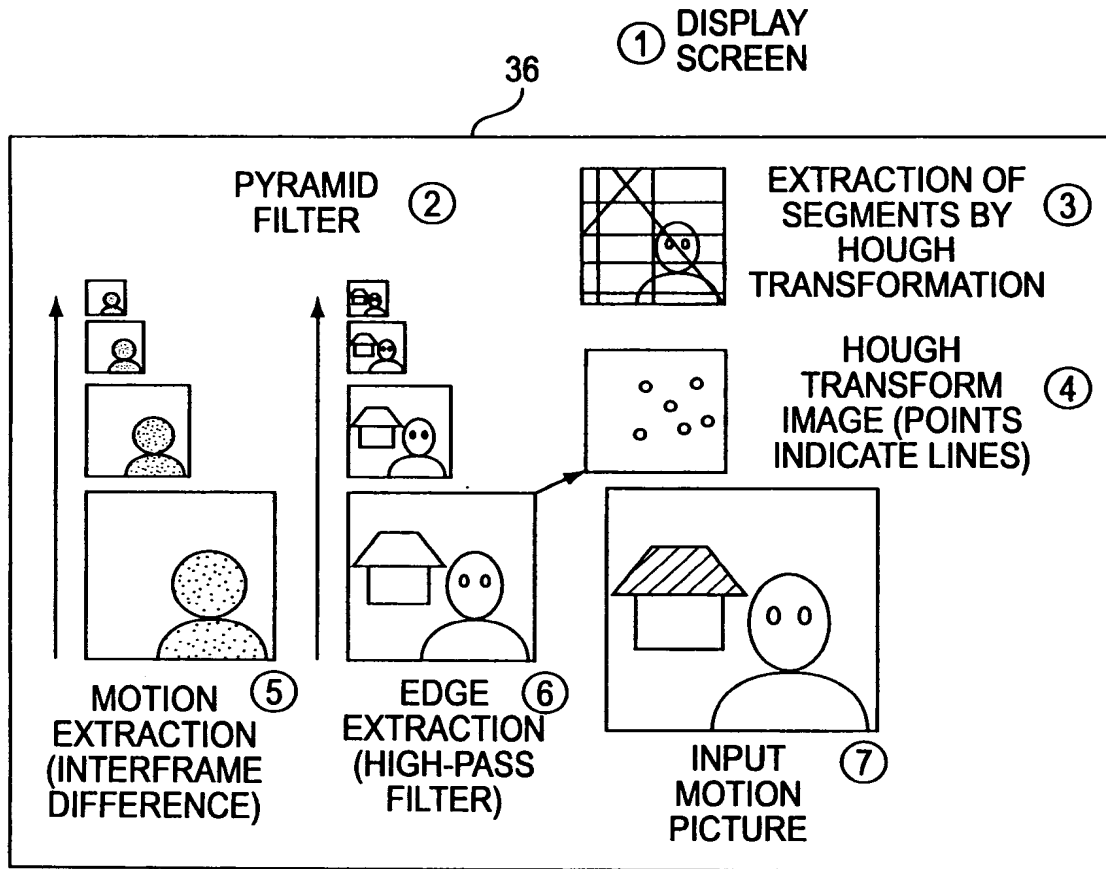


FIG. 48

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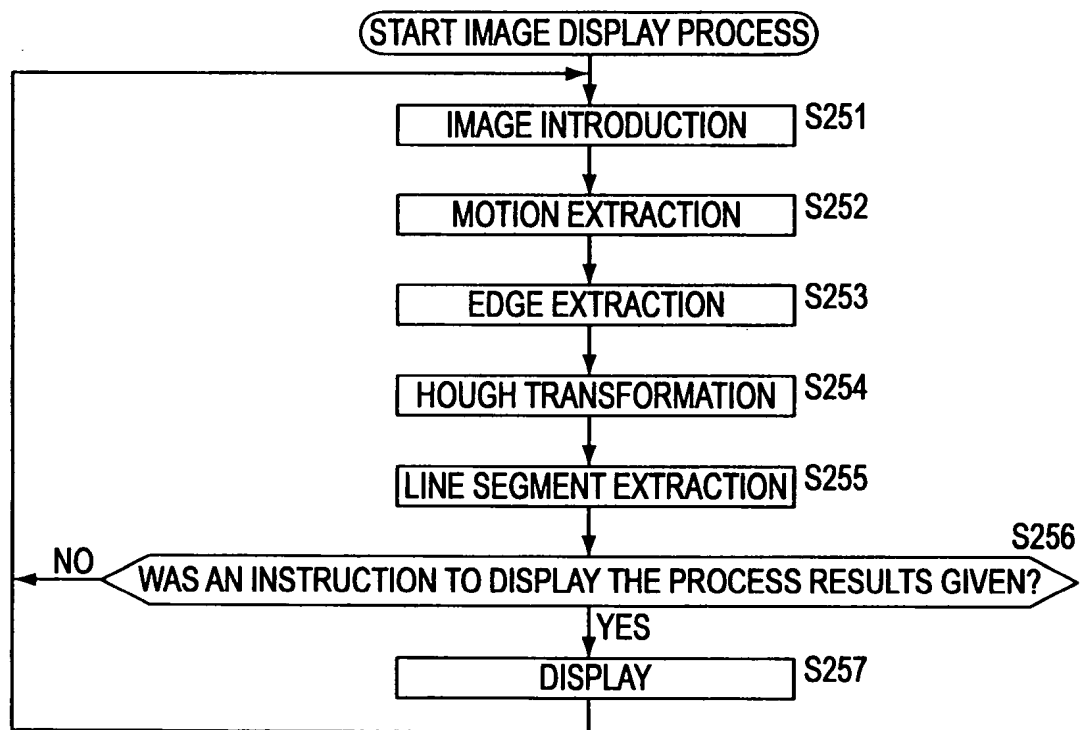


FIG. 49

(A)

0	-1	0
-1	4	-1
0	-1	0

(B)

-1	-1	-1
-1	8	-1
-1	-1	-1

(C)

$-1/4$	$-1/4$	$-1/4$
$-1/4$	2	$-1/4$
$-1/4$	$-1/4$	$-1/4$

(D)

$-1/8$	$-1/8$	$-1/8$
$-1/8$	1	$-1/8$
$-1/8$	$-1/8$	$-1/8$

FIG. 50